TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS

Expéditeur : le BUREAU INTERNATIONAL

PCT

NOTIFICATION DE TRANSMISSION DE COPIES DE LA TRADUCTION DU RAPPORT D'EXAMEN PRELIMINAIRE INTERNATIONAL

(règle 72.2 du PCT)

Destinataire :

SCHMIT, Christian, Norbert, Marie
SCHMIT - CHRETIEN - SCHIHIN SNC
8, place du Ponceau
F-95000 CERGY
FRANCE

Date d'expédition *(jour/mois/année)* 28 octobre 2004 (28.10.2004)	
Référence du dossier du déposant ou du mandataire 10593 WO SCT	**NOTIFICATION IMPORTANTE**
Demande internationale n° PCT/EP2003/050024	Date du dépôt international *(jour/mois/année)* 19 février 2003 (19.02.2003)
Déposant FCI etc	

1. **Transmission de la traduction au déposant.**

Le Bureau international transmet ci-joint copie de la traduction en langue anglaise qu'il a faite du rapport d'examen préliminaire international établi par l'administration chargée de l'examen préliminaire international.

2. **Transmission d'une copie de la traduction aux offices élus.**

Le Bureau international notifie au déposant qu'une copie de cette traduction a été transmise aux offices élus suivants qui exigent la traduction en question:

Aucun

Les offices élus suivants ont renoncé à l'exigence selon laquelle la transmission doit être effectuée à cette date; ils recevront une copie de cette traduction du Bureau international seulement à leur demande:

CA, EP, US

3. **Rappel concernant la traduction dans la ou l'une des langues officielles de l'office ou des offices élus.**

Il est rappelé au déposant que, lorsqu'une traduction de la demande internationale doit être remise à un office élu, cette traduction doit comporter la traduction de toute annexe du rapport d'examen préliminaire international.

Il appartient au déposant d'établir la traduction en question et de la remettre directement à chaque office élu intéressé (règle 74.1). Voir le volume II du Guide du déposant du PCT pour de plus amples renseignements.

Bureau international de l'OMPI
34, chemin des Colombettes
1211 Genève 20, Suisse

n° de télécopieur+41 22 740 14 35

Fonctionnaire autorisé
Ellen Moyse

n° de télécopieur+41 22 338 89 75

Translation

PATENT COOPERATION TREATY

Rec'd PCT/PTO 04 APR 2005

PCT/EP2003/050024

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 10593 WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP2003/050024	International filing date (*day/month/year*) 19 février 2003 (19.02.2003)	Priority date (*day/month/year*) 21 février 2002 (21.02.2002)
International Patent Classification (IPC) or national classification and IPC G02B 6/32		
Applicant FCI		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 9 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
10 septembre 2003 (10.09.2003)	24 May 2004 (24.05.2004)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/EP2003/050024

I. Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-9, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the claims:

pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages 1-10, filed with the letter of 30 April 2004 (30.04.2004)

☒ the drawings:

pages 1/2-2/2, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

national application No.
PCT/EP 03/50024

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-10	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-10	NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO

2. Citations and explanations

1. The documents (D) cited in the international search report will be referred to as D1 to D6 throughout the rest of the procedure. The numbering used matches the order in which said documents are cited in said report.

Furthermore, the following additional documents D7 to D9 are also considered to be relevant and have thus been added to the procedure by the examiner:

D7: EP 0 485 109 A
D8: Physics World, June 1992, pages 42-46
D9: Applied Optics, vol. 24, no. 16, August 1985, pages 2520-2525

2. The present independent claim 1 fails to comply with the requirements of clarity and/or support in the description, as stipulated in PCT Article 6 and PCT Rule 70.2(c), at least as far as the following points are concerned:

(a) The present phrase "(the two lenses having different diameters and/or radii of curvature) for causing widening of the light rays from fine to

broad or vice versa, between adjacent optical ports" appears to lack clarity and/or to go beyond the original disclosure, for the following reasons:

- The notion of "widening" is not only vague but also appears to be more suitable for defining the shape of a beam considered as a whole rather than that of individual light rays, as mentioned in the present application (in this regard, see page 5, lines 20-25 of the description).
- The notion of "widening of a light beam" also appears to be applicable to a divergent beam (cf., for example, page 5, lines 16-17 of the description) rather than a parallel beam, let alone a convergent beam.
- The notion of a "fine or broad (beam)", however, appears to be applicable only to a parallel beam and not to a divergent (or convergent) beam, which has a cross-sectional area that increases continuously in proportion to the distance from the point of divergence (or convergence).
- Furthermore, the original description appears to be totally ambiguous as far as the parallel or non-parallel nature of the original or final beams respectively emitted by the input optical fibre and received by the output fibre is concerned. Indeed, figures 1 and 4 show a parallel initial beam 18, yet the description states that instead said beam 18 is shown as being parallel merely to simplify the explanation and is not in fact parallel (cf. page 5, lines 12-15). This is actually accurate because it is well known that an optical fibre always emits a divergent beam. Figures 1 and 4 also show a parallel final beam 19. Consequently, it is reasonable to ask whether the beam in question is genuinely a parallel beam (for this to be the case,

the second lens would have to be designed in such a way that its focal length is such that its object focus coincides exactly with the point of convergence 24, of which the position is dependent both on the focal power of the first lens and on the position of the end surface of the input fibre relative to said first lens; all of these conditions are prerequisites but none of them is mentioned in the original description), or merely a simplified illustration of a parallel beam as in the case of the original beam.

- In any event, the wording of claim 1 in its present form does not specify that the final beam is parallel.

Consequently, the disputed expression discussed above will hereinafter be construed as meaning simply that "the two lenses have different diameters and/or radii of curvature *in order to optimise coupling between input and output fibres of which the respective emitting and receiving surfaces (i.e. the end surfaces of the cores thereof) have different surface areas*.

(b) The phrase "(set of two lenses) for distributing light rays spatially and by power density" is completely vague and has absolutely no limiting effect since "(any) distribution of light rays spatially and by power density" can always be found in any cross-section of any light beam [the present wording does not even mention that the set of lenses can lead to an output light distribution that is <u>different</u> from the input light distribution (notwithstanding the fact that inserting such an indication might contravene PCT Rule 70.2(c))].

(c) In the present independent claim 1, the term "optical ferrule connector" must also be construed as merely meaning a "device suitable for connecting optical ferrules". In other words, this means that the specific use claimed ("connecting optical ferrules") has practically no limiting effect on claim 1 in this respect, given that any known device that has at least part of the structural technical features of claim 1 is relevant to the present claim 1, if said known device were also to prove suitable for said specific use (whether or not said known device has actually been described as being suitable for said use).

3. The subject matter of the present independent claim 1, as interpreted in point 2 above, appears to lack an inventive step (PCT Article 33(3)) in the light of document D5 (English Abstracts of JP 63148210 A) in combination with the teaching of D3 (US 5 357 590 A).

Indeed, D5 discloses (see, in particular, the abstract) a device that also has all of the following structural features:
- a set of two lenses each having a flat surface (cf. lenses 61 and 62) and being urged against a plate made of transparent material [cf. transparent element 6, which can also be considered to be in the shape of a (thick) plate], thereby enabling the light rays to be distributed spatially and by power density [said distribution function is so vague, as mentioned in point 2 above, that it can be considered to be provided by any optical element], and
- an optical input port and an optical output port

having said lenses positioned therebetween [cf. the areas located immediately upstream from the first lens and immediately downstream from the second lens, respectively, which areas constitute an input port and an output port, respectively].
D5 also explicitly describes how the above-mentioned device is suitable for connecting optical ferrules (cf. the figure with the abstract).

It follows that the subject matter of the present claim 1 differs from the above-mentioned prior art only in that the two lenses have different diameters and/or radii of curvature "to cause widening of the light rays from fine to broad or vice versa, between adjacent optical ports", i.e., expressed more clearly (cf. point 2 above), to optimise coupling between respective optical input and output fibres of which the respective emitting and receiving end surfaces (i.e. the end surfaces of the cores thereof) have different surface areas [whereas the two lenses appear to have the same diameters and radii of curvature in D5, for optically coupling two identical optical fibres].

However, inserting two lenses having different diameters and radii of curvature between two waveguides having different core diameters is already known from D3 (cf., in particular, figure 3 and the corresponding description) as a means of optimising optical coupling between said two waveguides in spite of the fact that their emitting and receiving surfaces have different surface areas (cf., in particular, column 5, lines 22-27).

Consequently, it appears to be entirely obvious for

a person skilled in the art wishing to use the connector according to D5 to couple two fibres having different core diameters to use the teaching of D3, which has already solved the problem of optimising optical coupling between two different waveguides by using two lenses having different diameters and radii of curvature, and to decide to apply said teaching of D3 relating to the use of two lenses having different diameters and radii of curvature to the lenses of the device according to D5, thereby arriving directly at a connector matching the one according to the present claim 1.

4. Furthermore, the applicant's attention is drawn to the fact that any one of the other documents (D7, D8 or D9) could be substituted for D5, in combination with D3, for the purpose of depriving the subject matter of the present claim 1 of an inventive step.

5. The subject matter of the present dependent claims 2 to 10 also appears to lack an inventive step (PCT Article 33(3)).

The features in claims 2 and 3 are also already known from D5 (cf. the figure with the abstract), D7 (cf. figure 1), D8 (cf. figure 6) or D9 (cf. figure 2).

The features in claim 7 are also already known from D5 (cf. the figure with the abstract), D8 (cf. figure 6) or D9 (cf. figure 2).

The features in claim 8 are also already known from D8 (cf. figure 6) or D9 (cf. figure 3).

The features in claim 4 are merely a repetition of the features mentioned at the end of the present claim 1.

The features in the remaining dependent claims 5, 6, 9 and 10 appear to be trivial to a person skilled in the art.